

**DRUG RELEASE CHARACTERISTICS OF CM-CHITIN/SILK
FIBROIN BLEND FILMS**

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in Academic Partnership with
The University of Michigan, The University of Oklahoma,
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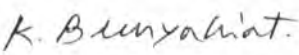
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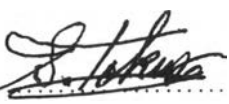
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Program: Polymer Science
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ABSTRACT

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CM-chitin/silk fibroin blend films were prepared by solution casting using glutaraldehyde as the crosslinking agent. The effects of pH and blend composition on swelling behavior of the blend films were investigated. CM-chitin and the blend films exhibited a minimum degree of swelling at pH 4 and showed a pH-sensitive character for all blend compositions studied. The degree of swelling of the blend films increased as the CM-chitin content increased. Drug release characteristics of CM-chitin and the blend films at 37 °C at simulated physiological pHs of pH 2.0, 5.5 and 7.2, were investigated using theophylline, diclofenac sodium, amoxicillin and salicylic acid as the model drugs. It was found that the releases of all model drugs from CM-chitin and the blend films at pH 7.2 were higher than those at pH 2.0 and pH 5.5, respectively. The amounts of model drugs released from the films from the highest to the lowest were in the following order: salicylic acid>theophylline>diclofenac sodium >amoxicillin. The drug releasing property of CM-chitin/silk fibroin blend films was compared to that of CM-chitin/PVA blend films using salicylic acid as a model drug. Both blend films showed similar drug release characteristic. However, the percentages of salicylic acid released from CM-chitin/silk fibroin blend films were slightly lower than those released from CM-chitin/PVA blend films.

บทคัดย่อ

รัชนีรัตน์ โรจนรักษ์: การศึกษาการปลดปล่อยของยาของฟิล์มพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและซิลไฟโบรอิน (Drug Release Characteristics of Carboxymethyl-Chitin/Silk Fibroin Blend Films) อ.ที่ปรึกษา: ศศ. ดร. รัตนา รุจิรวนิช และ ศ. ดร. เซอิจิ โทคุระ 167 หน้า ISBN 974-17-2343-1

งานวิจัยนี้เป็นการเตรียมฟิล์มของพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและซิลไฟโบรอินไฮโดรเจล ใช้เทคนิคการเตรียมด้วยสารละลาย โดยใช้กุกูตารัลดีไฮด์เป็นสารที่ก่อให้เกิดการเชื่อมโยง โดยศึกษาผลของพีเอชและพอลิเมอร์ผสมที่อัตราส่วนต่าง ๆ กันที่มีต่อการบวมตัวของฟิล์มพอลิเมอร์ผสม พบว่าระดับการบวมตัวของฟิล์มซีเอ็ม-ไคตินและฟิล์มของพอลิเมอร์ผสมมีอัตราการบวมตัวต่ำสุดที่พีเอช 4 ฟิล์มซีเอ็ม-ไคตินและฟิล์มของพอลิเมอร์ผสมที่อัตราส่วนต่างๆ แสดงลักษณะที่ไวต่อพีเอช การบวมตัวของฟิล์มของพอลิเมอร์ผสมเพิ่มขึ้น เมื่อปริมาณซีเอ็ม-ไคตินเพิ่มขึ้น การศึกษาการปลดปล่อยของยาของฟิล์มซีเอ็ม-ไคตินและฟิล์มของพอลิเมอร์ผสม ณ อุณหภูมิ 37 องศาเซลเซียส ในสารละลายที่มีค่าพีเอชสำหรับร่างกาย ที่พีเอช 2.0 5.5 และ 7.2 โดยได้เลือกใช้ทีโอไฟลีน กรดซาลิไซลิก ไคโคลฟีแนคโซเดียม และอมอกซิซิลิน เป็นยาต้นแบบ จากงานวิจัยนี้พบว่า สำหรับยาต้นแบบทุกชนิด ปริมาณยาที่ปลดปล่อยออกจากฟิล์มซีเอ็ม-ไคตินและฟิล์มของพอลิเมอร์ผสม ในสารละลายที่มีค่าพีเอช เป็น 7.2 มีปริมาณสูงกว่า ละลายที่มีค่าพีเอช เป็น 2.0 และ 5.5 ตามลำดับ เมื่อเปรียบเทียบปริมาณยาแต่ละชนิดที่ปลดปล่อยออกมาจากฟิล์มซีเอ็ม-ไคตินและฟิล์มของพอลิเมอร์ผสมพบว่าปริมาณของกรดซาลิไซลิกที่ปลดปล่อยออกจากฟิล์มผสมมีมากกว่าทีโอไฟลีน ไคโคลฟีแนคโซเดียมและอมอกซิซิลิน ตามลำดับ การเปรียบเทียบคุณสมบัติของการปลดปล่อยของยา ระหว่างฟิล์มพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและซิลไฟโบรอิน และการปลดปล่อยของยา ระหว่างฟิล์มพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและพอลิไวนิล แอลกอฮอล์ โดยได้เลือกใช้กรดซาลิไซลิก เป็นยาต้นแบบ พอลิเมอร์ผสมทั้งสองมีลักษณะการปลดปล่อยของยาที่คล้ายกัน พบว่าเปอร์เซ็นต์การปลดปล่อยของกรดซาลิไซลิกจากฟิล์มพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและซิลไฟโบรอินต่ำกว่าการปลดปล่อยของยาของฟิล์มพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและพอลิไวนิล แอลกอฮอล์เล็กน้อย

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